PATENT

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

IN THE APPLICATION OF: CONFIRMATION NO. 7389

HIROYUKI SUMI ET. AL. CASE NO.: AD6932USNA

APPLICATION NO.: 10/728334 GROUP ART UNIT: 1713

FILED: DECEMBER 04, 2003 EXAMINER: SATYA B. SASTRI

FOR: FLAME RESISTANT POLYESTER RESIN COMPOSITION

Commissioner for Patents
P.O. Box 1450
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**AMENDED APPEAL BRIEF**

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**Real Party in Interest**

The real party in interest is the assignee, E.I. DuPont de Nemours & Co., Inc., a corporation of Delaware.

**Related Appeals and Interferences**

None known to the applicants.

**Status of Claims**

Claims 1-16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Harashina et al. (WO 01/48086) in view of Takahashi et al. (US 4,742,109). Claim 17 was previously canceled.

**Status of Amendments**

No amendments were filed after final rejection and thus no amendments are pending.

**Summary of Claimed Subject Matter**

The present invention relates to a thermoplastic polyester resin composition comprising (A) thermoplastic polyester (see page 3, line 1 to page 4, line 28); (B) phosphorus containing flame retardant (see page 4, line 29 to page 6, line 9); (C) phenolic polymer (see page 6, line 11 to page 7, line 27); and (D) thermoplastic acrylic polymer (see page 7, line 28 to page 8, line 21). The composition may optionally comprise additional components, such as inorganic reinforcing agents (see page 8, lines 22 to 28); plasticizers (see page 8, lines 29 to 32); nucleating agents (see page 8, line 34 to page 9, line 1); and other additives (see page 9, lines 1 to 4). The resin composition is prepared by melt blending the component ingredients (see page 9, lines 5 to 17) and may be formed (such as by molding) into a wide variety of articles, including those for use in electrical and electronic applications, and is especially useful for applications where flame retardancy is needed (see page 9, lines 18 to 22). The composition is particularly useful for the preparation of parts that are to be laser welded to other polymeric parts (see page 9, lines 22 to 26).

**Grounds of Rejection to be Reviewed Upon Appeal**

Whether claims 1-16 are unpatentable under 35 U.S.C. 103(a) over Harashina et al. (WO 01/48086) in view of Takahashi et al. (US 4,742,109).

**Argument**

Rejection of claims 1 to 16 under 35 U.S.C. 103(a) over Harashina et al. (WO 01/48086) in view of Takahashi et al. (US 4,742,109)

In the initial rejection of claims 1-16 over Harashina et al. in view of Takahashi et al. (the office action of Oct. 19, 2005), the examiner stated that Harashina et al. disclose flame retardant polyester resins containing phosphazene compounts and phenolic resins and that the difference between the disclosure of Harashina et al. and the present invention is the inclusion of thermoplastic acrylic polymer.

The examiner further stated that Takahashi et al. disclose poly(butylene terephthalate) resin compositions containing flame retardants and polyacrylate resins, where the polyacrylate resin is used to mitigate the decreased impact resistance and extensibility caused by the incorporation of the flame retardants into the compositions.

The examiner concluded that it would therefore be obvious to one of ordinary skill in the art to include polyacrylate resins in the compositions of Harashina et al. to arrive at the present invention.

In response, the applicants pointed out that the compositions of the present invention possess a unique combination of properties in that they are simultaneously flame retardant, laser weldable, and have good impact resistance. Laser welding is an increasingly desirable method for fabricating articles from polymeric parts and is particularly useful for making articles for electronic and electrical applications. Many of these applications require that the polymeric materials used be flame retardant and have good impact resistance. Laser welding typically involves placing surfaces of two polymer parts (one of which is relative transparent and one of which is relatively opaque to light at the wavelength of the laser used) in contact with one another and using a laser to irradiate a surface of the relatively transparent part at points opposite the surface that is in contact with the relatively

opaque part. A sufficient amount of laser light passes through the relatively transparent part and is absorbed by the relatively opaque part to melt the polymers at the junction and thereby create a bond between the two parts.

For this technique to be successful, the polymeric material comprising the first part must be sufficiently transparent to radiation at the wavelength of the laser being used to penetrate the part and create the bond. However, many additives used to prepare polymeric compositions absorb and/or scatter too much light at wavelengths convenient for laser welding to allow the resulting compositions to be used as the relatively transparent part in a laser welding operation. This is true of many impact modifiers and flame retardants commonly used to prepare polyester compositions. For example, the use of traditional halogenated flame retardant systems leads to compositions that are not laser weldable (see, for example, Example 3 and Comparative Example 3 and 4 of the present invention). Additionally, the use of typical polyethylene-based impact modifiers for thermoplastic polyesters, such as ethylene/methyl acrylate polymers; ethylene/glycidyl methacrylate polymers; ethylene/butyl acrylate/ glycidyl methacrylate polymers; and the like lead to compositions that are insufficiently transparent to be laser welded.

However, the presently claimed combination of thermoplastic polyester, phosphorus-containing flame retardant, phenolic polymer, and thermoplastic acrylic resin is not only is flame retardant and has good impact strength, but it may be laser welded. The applicants argued that no hint is given in the disclosures of Harashina et al. or Takahashi et al. that this combination of components would have this highly desirable and difficult to attain combination of properties, and that one of skill in the art would have had no motivation to combine the teachings of Harashina et al. with those of Takahashi et al. to arrive at the present invention.

In a second, final, rejection of claims 1-16 (the office action of June 21, 2006), the examiner reiterated that the disclosure of Harashina et al. discloses flame retardant poly(ethylene terephthalate) and poly(butylene terephthalate) compositions comprising

phosphazene compound and phenolic resin and that Takahashi et al. disclose poly(butylene terephthalate) compositions comprising a polyacrylate and a silane coupling agent so as to improve impact resistance and elongation. The examiner stated that it would have been obvious to combine the two references to maintain good mechanical and flame retardant properties of poly(butylene terephthalate) compositions, as Harashina et al. teach that adding phenolic resin maintains mechanical properties while Takahashi et al. disclose the addition of a polyacrylate and a silane coupling agent for the same purpose, and hence that it is *prima facie* obvious to combine two ingredients where each is targeted by the prior art to be useful for the same purpose.

The applicants rebut the conclusion that a *prima* facie case of obviousness has been made. In the present invention, the phenolic polymer provides the composition with good flame resistance, surface appearance, and improved melt flow properties (see page 7, 26-27). A comparison of Example 1 with Comparative Example 1 demonstrates that the compositions of the present invention have similar flame retardance and physical properties to compositions containing traditional brominated flame retardant systems. However, as shown by a comparison of Example 3 with Comparative Examples 3 and 4, the use of brominated flame retardant systems (flame retardant and synergist) provides compositions that are not laser weldable. Furthermore, a comparison of Example 2 with Comparative Example 2 demonstrates that compositions having acrylic polymer have improved impact resistance relative to compositions without impact modifier.

Thus, when looked at as a whole, all of the components of the present invention are necessary to produce a flame retardant thermoplastic polyester composition that both has good physical properties *and* is laser weldable. "In determining whether the invention as a whole would have been obvious under 35 U.S.C. 103, we must first delineate the invention as a whole. In delineating the invention as a whole, we look not only to the subject matter which is literally recited in the claim in question...but also to those properties

of the subject matter which are which are inherent *and* are disclosed in the specification." *In re Antonie*, 559 F.2d 618, 629, 195 USPQ 6.8 (CCPA 1977).

No suggestion or hint is given in the disclosures of Harashina et al. or Takahashi et al. that in order to obtain a polyester composition that meets the demanding requirements that it be simultaneously flame retardant and laser weldable, as well as having good physical properties, one should select the particular impact modifiers described by Takahashi et al. to combine with the particular flame retardants of Harashina et al.

Additionally, given that a wide variety of impact modifiers and flame retardant systems commonly used in polyester compositions yield compositions that cannot be laser welded, one skilled in the art would have had no incentive to combine the particular impact modifiers described by Takahashi et al. with the particular flame retardants of Harashina et at. with the expectation of achieving a flame retardant, laser weldable composition having good physical properties.

Since the "teaching or suggestion to make the claimed combination *and* the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure" (emphasis added) *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991), the applicants believe that in view of the invention as a whole, a *prima facie* case of obviousness has not been made, and consequently that claims 1-16 are not obvious over Harashina et al. in view of Takahashi et al.

Accordingly, it is respectfully requested that the Examiner's rejection be withdrawn and the case remanded to the Examiner for allowance.

The Commissioner is hereby authorized to charge the required fee or credit any overpayment to Deposit Account No. 04-1928.

Respectfully submitted,

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## Claims Appendix

1. (Previously Presented) A flame resistant, laser weldable polyester resin composition, comprising:

(A) 10 to 90 weight percent thermoplastic polyester;

(B) 1 to 35 weight percent phosphorus containing flame retardant;

(C) 1 to 25 weight percent phenolic polymer; and

(D) 1 to 25 weight percent thermoplastic acrylic polymer;

the above stated percentages being based on the total weight of the components A-D.

2. (Original) The polyester resin composition of Claim 1, further comprising up to about 120 parts by weight of an inorganic reinforcing agent per 100 parts by weight of the sum of the said components (A), (B), (C), and (D).

3. (Original) The polyester resin composition of Claim 1 wherein said phenolic polymer is a novolac.

4. (Original) The polyester resin composition of Claim 2 wherein said phenolic polymer is a novolac.

5. (Original) The polyester resin composition of Claim 1 wherein the phosphorus containing flame retardant is an oligomeric aromatic phosphate ester.

6. (Original) The polyester resin composition of Claim 5 wherein the-oligomeric aromatic phosphate ester is resorcinol bis(di-2,6-xylyl)phosphate.

7. (Original) The polyester resin composition of Claim 2 wherein the phosphorus containing flame retardant is an oligomeric aromatic phosphate ester.

8. (Original) The polyester resin composition of Claim 7 wherein the-oligomeric aromatic phosphate ester is resorcinol bis(di-2,6-xylyl)phosphate.

9. (Original) The polyester resin composition of Claim 3 wherein the phosphorus containing flame retardant is an oligomeric aromatic phosphate ester.

10. (Original) The polyester resin composition of Claim 9 wherein the-oligomeric aromatic phosphate ester is resorcinol bis(di-2,6-xylyl)phosphate.

11. (Original) The polyester resin composition of Claim 4 wherein the phosphorus containing flame retardant is an oligomeric aromatic phosphate ester.

12. (Original) The polyester resin composition of Claim 11 wherein the-oligomeric aromatic phosphate ester is resorcinol bis(di-2,6-xylyl)phosphate.

13. (Previously Presented) The polyester resin composition of Claim 1 wherein said thermoplastic polyester is selected from the group consisting of poly(ethylene terephthalate) (PET), poly(1,4-butylene terephthalate) (PBT), poly(propylene terephthalate) (PPT), and mixtures of at least two of PET, PBT, and PPT.

14. (Original) The polyester resin composition of Claim 1 wherein a part or whole of component (d) has a glass transition temperature of not higher than 0 °C.

15. (Original) The polyester resin composition of Claim 1 wherein component (d) has a core-shell structure.

16. (Original) An molded article comprising the polyester resin composition of Claim 1.

17. (Cancelled)

## Evidence Appendix

None

## Related Proceedings Appendix

None